The Piscicolid leech *Austrobdella translucens*, Badham, 1916: a new host record from Australian salmon, *Arripis trutta* (forster, 1801), and a new locality record for Yellowfin whiting, *Sillago schomburgkii*, Peters 1864, in South Australia

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ABSTRACT

The piscicolid leech *Austrobdella translucens* was found on a single specimen of the eastern Australian salmon, *Arripis trutta, and* 22% of specimens of yellowfin whiting, *Sillago schomburgkii*, in Port Lincoln, South Australia between August-September 2004. In 2005, the number of yellowfin whiting parasitized by the leech increased to 71%. The appearance of this large, conspicuous ectoparasite is intriguing because it was thought to be an exclusive parasite of three closely-related species of inshore sillaginid fishes (the 'sand whitings', *S. schomburgkii* in Western Australia, *S. analis* in Queensland, and *S. ciliata* in Queensland and New South Wales), and also to be endemic to marine waters of tropical Australia (to as far south as the Shoalhaven River, south of Sydney). Up to 8 leeches were found on specimens of yellowfin whiting, covering most of the surface of their tail fins. *Austrobdella translucens* has been associated with mortalities of pond held whiting, and its appearance in temperate waters of South Australia on a non-sillaginid is potentially concerning because of the high concentration of cage-based finfish aquaculture. The taxonomy of leeches based on morphological features is difficult, and molecular analyses are needed to confirm the taxonomic affinity and origin of the piscicolid leech reported here.

Key words: parasitic leech, *Austrobdella translucens,* yellowfin whiting, salmon

Introduction

The parasitic leech of fishes (i.e., piscicolid leech) *Austrobdella translucens* (order: Hirudinida, family: Piscicolidae) feeds on blood from the tail fins of sillaginid fish. This species is thought to be endemic to tropical marine waters of Australia, and has been reported on fishes from along the east coast of Australia (Badham, 1916; Hayward, 1997a) and Shark Bay, Western Australia (Hayward, 1997a). *Austrobdella translucens* is also thought to be a highly host-specific ectoparasite of three species of closely-related inshore sillaginid fishes, the 'sand whitings' (Hayward, 1997b), but has never been recorded from King George whiting (*Sillaginodes punctatus* previously examined from Victoria, Western Australia and South Australia) or yellowfin whiting, *Sillago schomburgkii.* Here we report the appearance of *A. translucens* on the tail fin of a single specimen of Australian salmon *Arripis trutta* (Forster, 1801) (*family* Arripidae), and on the tail fins of yellowfin whiting, *Sillago schomburgkii*, Peters, 1864, caught by hook and line in the temperate waters off Port Lincoln, South Australia.

Results and Discussion

Individuals of a piscicolid leech (*i.e.,* fish leech) attached to the tail fins of yellowfin whiting, *Sillago schomburgkii*, (Fig. 1) were brought to the Lincoln Marine Science Centre, Port Lincoln, South Australia, in August 2004 by a concerned recreational fisherman. The leech was identified as *Austrobdella translucens* based on morphological features. Anecdotal evidence from eighteen recreational fishermen who regularly capture yellowfin whiting along the shores of Port Lincoln suggests that this conspicuous leech was not previously present on fish in the area. Subsequent observations of 123 specimens of yellowfin whiting caught by recreational fishermen during August and September 2004 revealed that 28 (22%) of these fish were parasitized by *A. translucens*. During August and September 2005, observations of 85 specimens caught by recreational fishermen showed that 61 (71%) were parasitized by *A. translucens*. The number and sizes of leeches on twenty specimens were recorded in 2004 (Table 1), and the number of leeches on 61 parasitized specimens were recorded in 2005. A single

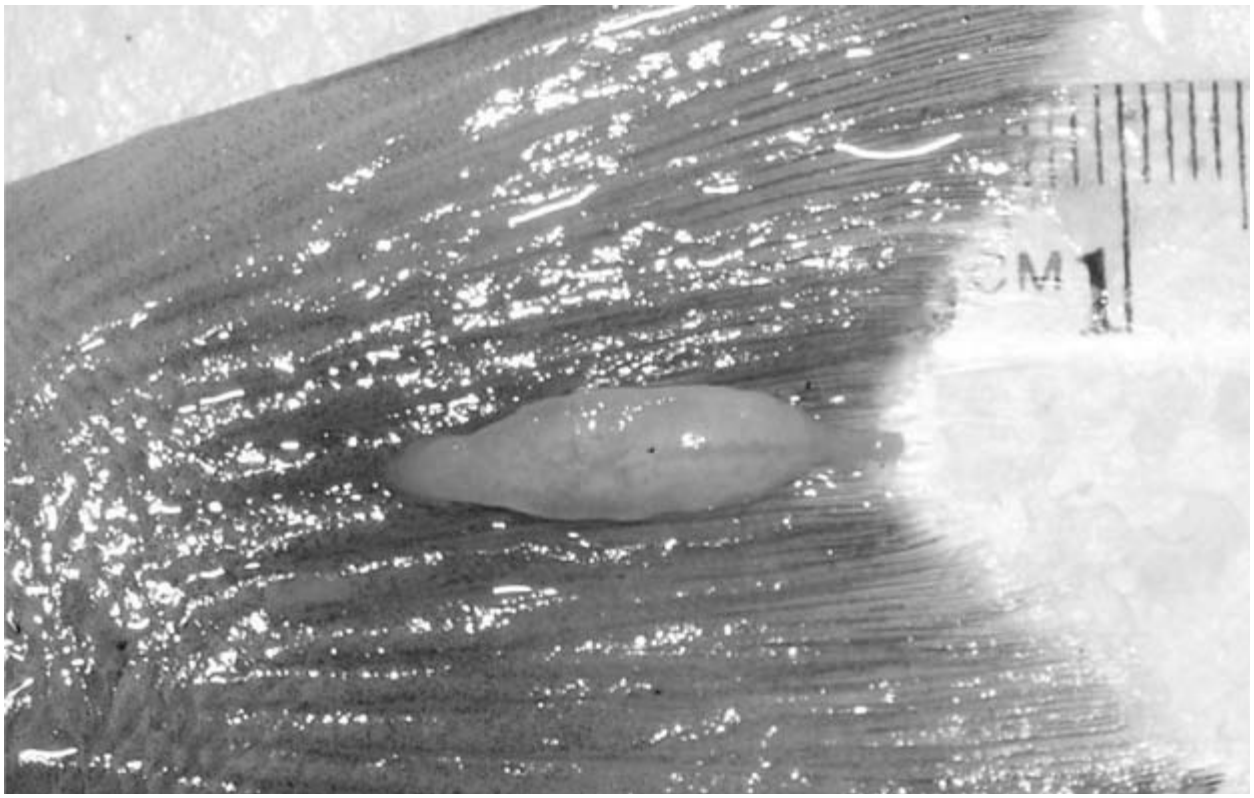

Figure 1. The piscicolid leech *Austrobdella translucens* attached to the tail fin of a yellowfin whiting, *Sillago schomburgkii,* caught from shore in Port Lincoln, South Australia.

Table 1. *Austrobdella translucens* leeches parasitizing specimens of yellowfin whiting, Sillago schomburgkii, and eastern Australian salmon, *Arripis trutta,* captured in Port Lincoln, South Australia, in 2004. The number of leeches found on each fish specimen and their lengths (mean±S.E.) are given.

Length of yellowfin whiting (mm)	No. leeches	Lengths of leeches (mm)
350	2	17.5±0.5
370	3	15.0±1.1
332	5	17.8±1.0
354	3	18.6±2.3
321	3	18.6±1.4
372	5	16.6±1.6
337	3	19.6±1.7
345	1	22
289	4	17.0±1.0
293	2	20.0±1.0
362	3	15.0±1.1
285	4	13.5±1.3
287	1	25
357	8	18.7±1.0
365	1	17
235	2	19.7±1.0
302	3	17.6±3.4
273	4	13.7±1.3
337	3	19.6±1.7
331	2	20.5±2.5
223	1	19
	Total	**17.6±0.4**

specimen of *A. translucens* was also observed attached to the tail fin of an eastern Australian salmon, *Arripis trutta in 2004. The average length of* A. translucens was 17.6 mm. Linear regression analysis showed that there was no significant relationship between the lengths of fish and the lengths of leeches that they hosted ($r^2 = 0.01$, $F = 0.625$, $p = 0.432$). This suggests that the age of the fish is not related to its susceptibility to parasitization by the leech. The number of leeches on parasitized fish ranged from 1 to 8 in 2004 (Table 1) and 1 to 4 in 2005. A *t*-test showed that there was no significant difference in the numbers of leeches on yellowfin whiting between 2004 and 2005 ($t = 1.71$, $P = 0.40$, $d.f. = 23$). Thus, while the number of fish parasitized by *A. translucens* increased from 22 to 71%, the number of parasites on each fish did not change.

Austrobdella translucens has previously been associated with mortalities of pen-held whiting (Badham, 1916). Fish held in captive conditions are often susceptible to disease due to physiological and physical stress resulting from high stocking densities, poor nutrition, and poor sanitation (*e.g.* Barton *et al.*, 1991; Barton, 2002). The mortalities reported by Badham (1916) may therefore have resulted from the culture conditions and consequent stresses upon the fish. Nonetheless, *A. translucens* is clearly capable of affecting the health of fish. Other species of marine leeches are similarly known to be associated with disease: for example, *Zeylanicobdella arugamensis* was reported to cause swelling and hemorrhages on the fins of wild and cultured groupers, *Epinephelus coioides*, in the Philippines (Cruz-Lacierda *et al.*, 2000). Furthermore, piscicolid leeches are also known vectors of trypanosomes and viruses (see Karlsbakk, 2004 and references therein)

and so parasitism by these leeches may result in multiple stresses upon fish. The large numbers of *A. translucens* found on some specimens of yellowfin whiting are therefore concerning.

Austrobdella translucens were previously thought to be endemic to tropical marine waters of Australia (at least as far south as the Shoalhaven River, about 150 km south of Sydney), and to be exclusive parasites of sillaginid fish. The observations of *A. translucens* parasitizing a large proportion of yellowfin whiting and a specimen of eastern Australian salmon in temperate waters are therefore intriguing. There are at least several possible explanations for these observations. First, our findings may indicate a recent extension of the distribution of *A. translucens* into temperate waters through either natural or human-mediated mechanisms. Alternatively, *A. translucens* may have always been present in temperate waters on sillaginid and arripid fishes, but was previously unnoticed. This explanation, however, seems unlikely given that this leech is a large conspicuous ectoparasite (Fig. 1). Second, yellowfin whiting that were parasitized by *A. translucens* in more northerly waters may have migrated to Spencer Gulf, South Australia. This also seems unlikely because stocks in the Gulfs of South Australia are thought to be separated by habitats inhospitable to yellowfin whiting (McLoughlin *et al.*, 1993). Third, factors influencing the health of Australian salmon may have made them susceptible to infection by *A. translucens*, which is thought to be an otherwise highly host-specific parasite of inshore sillaginid fishes. Stress is thought to increase the susceptibility of fishes to parasites that are host-specific to other species (*e.g.* the monogenean gill fluke *Polylabris tubicirrus* is common on fishes of the genus *Diplodus* in the wild, but has been reported only from *Sparus aurata* only when it was cultured (see Silan *et al.*, 1985), and may explain the observation of *A. translucens* parasitizing a specimen of *Arripis trutta*. *Alternatively,* A. translucens may simply not be as host specific as previously thought.

Molecular analyses of leech classification are revealing that traditional taxonomy based on morphological analyses is often inaccurate (Siddall and Borda, 2002). It is possible that the leech reported here is a distinct species that cannot be separated from *A. translucens* based on morphology. While molecular analyses of leeches are in their infancy, future studies are likely to reveal large numbers of cryptic species as they have done for other invertebrate groups (e.g. Dawson and Jacobs, 2001; Westheide, 2001; Gomez et al., 2002; Mcgovern and Hellberg, 2003). Therefore, molecular analyses are required to confirm both the identity and origin of the piscicolid leech reported here. Regardless of its taxonomic affinity or origin, the appearance of this leech in Port Lincoln is potentially concerning because of the high concentration of cage aquaculture of marine finfishes (yellowtail kingfish, *Seriola lalandi*; mulloway, *Argyrosomus japonicus*, and southern bluefin tuna, *Thunnus maccoyii*) in the region. Given the possibility for highly host-specific parasites to cross to alternative hosts in situations where the host is stressed, continued monitoring of the prevalence of this leech in southern Australia is warranted.

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